

## Ten years of marine current measurements in Espartel Sill, Strait of Gibraltar

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Almost ten-year of Acoustic Doppler Current Profiler (ADCP) observations collected at the westernmost sill (Espartel sill) of the Strait of Gibraltar by a monitoring station, first installed in year 2004, have been carefully processed to provide the most updated estimation of the outflow of Mediterranean water through the Strait. A comprehensive quality control of the factors affecting the uncertainty of the measurements has been carried out and a great care has been paid to infer the current at the bottom layer, where direct observations are lacking. The mean outflow in the southern channel of the sill section, where the monitoring station is installed, has been estimated as  $-0.82 \text{ Sv}$  ( $1 \text{ Sv} = 1 \times 10^6 \text{ m}^3 \text{ s}^{-1}$ ), with an average contribution of the eddy fluxes of  $-0.04 \text{ Sv}$ . This figure is an overestimation, as the vertical profile at the mooring site was assumed valid for the whole section, thus ignoring the lateral friction. On the other hand, it only gives the flow through the south channel and disregards the fraction flowing through shallower north part. Both drawbacks have been addressed by investigating the cross-strait structure of the outflow from hindcasts produced by the MITgcm numerical model, which was run in a high-resolution domain covering the Gulf of Cádiz and Alboran Sea basins. An overall rectifying factor of 1.039 was found satisfactory to correct the first estimate, so that the final mean outflow computed from this dataset is  $-0.85 \text{ Sv}$ , which is complemented with an uncertainty of  $\pm 0.03 \text{ Sv}$  based on the interannual variability of the series. The time analysis of the series shows an outflow seasonality of around the 8% of the mean value, with maximum outflow in early spring.